ACCESSION #: 9611140164

LICENSEE EVENT REPORT (LER)

FACILITY NAME: Maine Yankee Atomic Power Company PAGE: 1 OF 3

DOCKET NUMBER: 05000309

TITLE: PLANT TRIP DURING REACTOR PROTECTION SYSTEM SURVEILLANCE

EVENT DATE: 10/09/96 LER #: 96-031-00 REPORT DATE: 11/08/96

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 7 POWER LEVEL: 90%

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:

50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:

NAME: Ethan Brand, NSEG Supervisor TELEPHONE: (207) 882-5661

COMPONENT FAILURE DESCRIPTION:

CAUSE: SYSTEM: COMPONENT: MANUFACTURER:

REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On October 9, 1996, Maine Yankee was operating at 2440 MWt (90.3% power) when the reactor scrammed. The reactor trip breakers opened without any initiating trip signals having been received. At the time of the trip, the logic trip relay surveillance was in progress and reactor trip breakers #3 and #7 were open as part of the surveillance. All safety related systems responded correctly upon the plant trip.

The exact cause of the trip has not been determined. The apparent cause of the trip was voltage transient in the logic circuitry being tested during the surveillance. Additional testing and analysis are being performed to attempt to determine the exact cause of the trip, including bench testing o the circuit to identify any potential design deficiencies

which might have contributed to the event. Also being considered is additional monitoring of the circuit during the next surveillance.

The following logic matrix components which were undergoing testing at the time of the trip were replaced prior to plant restart: the test power supply and the Matrix Relay Hold push-button. Also, the circuitry was thoroughly tested (with no problems found) and the logic trip relay surveillance was completed before a plant restart.

NOTE: This text document was processed from a scanned

INITIAL PLANT CONDITIONS:

On October 9, 1996, Maine Yankee was in Mode 7, Power Operations, at 2440

MWt steady state power, 90.3%.

EVENT DESCRIPTION:

On 10/9/1996 at 0950 the reactor scrammed when the reactor trip breakers

opened without any initiating trip signals having been received. At the

time of the trip the Reactor Protective System(RPS)(JC) Logic Trip Relays

Test surveillance was in progress on the "AC" logic matrix and reactor

trip breakers #3 and #7 were open as part of the surveillance.

SAFETY SIGNIFICANCE:

The safety significance was minimal. All safety related systems responded correctly upon the trip.

CAUSAL FACTORS:

Note: the RPS logic system was designed by Combustion Engineering as part of original plant equipment.

Refer to the attached diagram for the following discussion:

The RPS Logic Trip Relays Test surveillance tests each of four "K" relay (RLY) trip logic circuits. Each "K" relay opens two (of eight total) Reactor Trip Breakers (52). At least four Reactor Trip Breakers must open to cause a reactor trip. There are six logic matrixes (AB, AC, AD, BC, BD and CD), each with four logic matrix relays. Each matrix relay has an associated contact in its respective "K" relay circuit. To allow testing of each of the 24 (four in each of six logic matrixes) matrix relays without causing a reactor trip, only one "K" relay is allowed to de-energize at a time. This is accomplished by applying a hold current to a second coil in the three logic matrix relays not being tested in the specific logic matrix. The logic matrix being tested is then deenergized which in turn de-energizes the one logic relay not being supplied with hold current. This hold current is supplied by a single test power supply. Normally, the logic matrix relays are energized by auctioneered power supplies through the matrix trip

Conducting the surveillance involves manipulating two rotary contact switches (HS) and a push-button switch; the Channel Trip Select Switch (which selects one of the ten possible trips), the Matrix Relay Trip Select Switch (which selects one of the four Logic matrix relays)), and the Matrix Relay Hold push-button switch (which applies a holding current to the non-tested matrix relays and inserts the trip selected by the Channel Trip Select Switch).

A fault tree was constructed to identify possible malfunctions that could cause a plant trip during the surveillance. This analysis identified that an interruption of the hold current for the matrix relays would result in a plant trip. This was verified by test before plant startup.

Three components were identified which could result in interruption of the hold current: the power supply itself (or its supply), the Matrix Relay Hold push-button, and the Matrix Relay Trip Select Switch. While the plant was shutdown with the reactor trip breakers closed, each of these components (in the AC logic matrix) were manipulated as they would be in the test, with no problems noted. The power supply and the Matrix Relay Hold push-button switches were replaced before startup as a precautionary measure. The Matrix Relay Trip Select Switch was not replaced as no spare was available before startup.

Prior to plant startup, the RPS surveillance was completed with no other problems.

CORRECTIVE ACTIONS:

- The following AC logic matrix components that were undergoing testing at the time of the trip were replaced: the test power supply and the Matrix Relay Hold push-button. The circuitry was thoroughly tested and the RPS surveillance completed before plant restart.
- Additional testing and analysis are being performed to attempt to determine the exact cause of the trip, including bench testing of the circuit to identify any potential design deficiencies that might have contributed to the event.
- Additional monitoring of the circuit during the next surveillance is being considered.
- Combustion Engineering has been consulted on this problem and is providing additional assistance.

PREVIOUS SIMILAR EVENTS:

No previous similar reactor trips have been reported via LER. Maine Yankee has had two apparently similar reactor trips, in 1974 and in 1978; both of these previous trips occurred during RPS surveillance testing. The 1974 event appeared to be due to a faulty selector switch, and the 1978 event to faulty logic matrix relay.

TABLE " Logic Matrix AB" omitted.

Maine Yankee

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November 8,1996

MN-96-163 JRH-96-242

UNITED STATES NUCLEAR REGULATORY COMMISSION

Attention: Document Control Desk

Washington, D. C. 20555

Reference: (a) License No. DPR-36 (Docket No. 50-309

Subject: Maine Yankee Licensee Event Report 96-031, Plant Trip During Reactor Protection System Surveillance

Gentlemen:

Please find enclosed Maine Yankee Licensee Event Report 96-031. This report is submitted in accordance with 10 CFR 50.73(a)(2)(iv).

Please contact us should you have any questions regarding this matter.

Very truly yours,

James R. Hebert, Manager

Licensing & Engineering Support Department

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Enclosure

c: Mr. Hubert Miller

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*** END OF DOCUMENT ***ACCESSION #: 9611140236